Yakeen NEET 2.0 2026
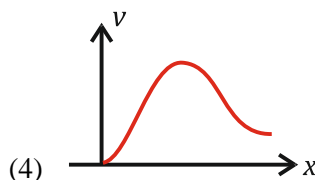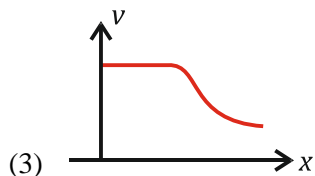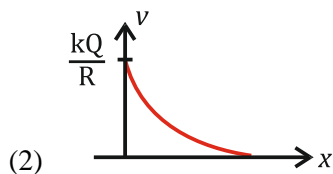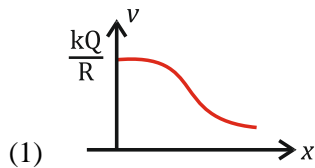
Basic Maths and Calculus (Mathematical Tools)

Assignment-03
By: M.R. Sir

1. The electric potential due to a uniformly charged ring at axial point can be given by formula $V = \dfrac{kQ}{\sqrt{R^2 + x^2}}$, which of the following is correct V vs x graph
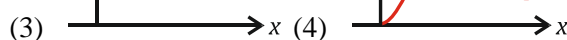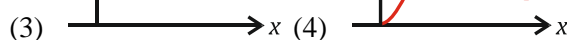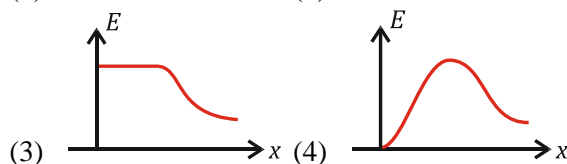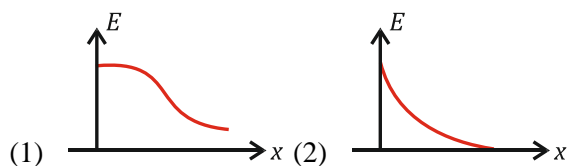

(1)

(2)

(3)

(4)

2. The electric field due to a uniformly charged ring at axial point can be given by formula $E = \dfrac{kQx}{(R^2 + x^2)^{3/2}}$, which of the following is correct E vs x graph:

(1) (2)

(3) (4)

3. Current through a charging capacitor in RC circuit can be given by formula $i = i_0\left(1 - e^{-t/\tau}\right)$ where i is current and t is time, which of the following is correct i vs t graph

(1)

(2)

(3)

(4)
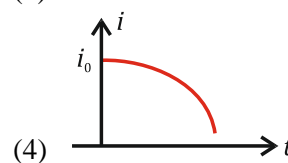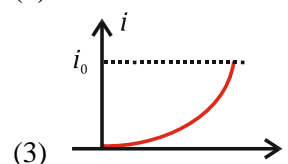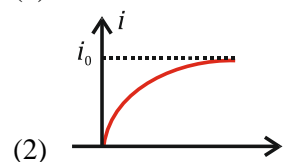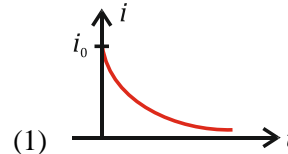
4. Voltage of a discharging capacitor in RC circuit can be given as $V = V_0 e^{-t/\tau}$, which of the following is correct V vs t graph

(1)

(2)

(3)

(4)
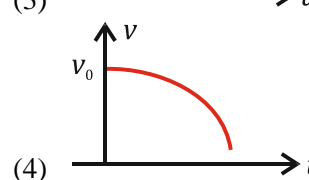
5. Which of the following represents correctly for γ vs θ for the function $\gamma = 5 \sin (\theta + 30°)$

(1)

(2)

(3)

(4)
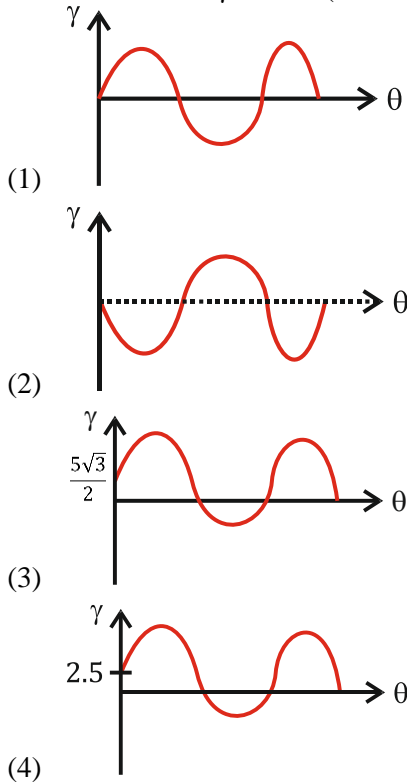
6. $\sin \theta$ vs θ graph is given below find value of a, b and c
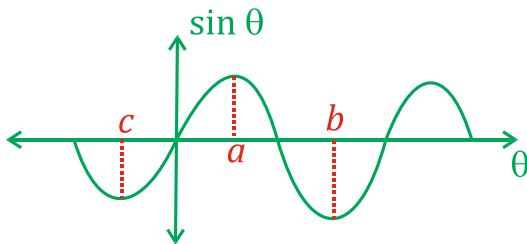
7. Displacement time graphs of two moving particles make angles of 30° and 45° with the x-axis as shown in figure, ratio of their respective velocity is

(1) $1 : \sqrt{3}$

(2) $\sqrt{3} : 1$

(3) $1 : 1$

(4) $1 : 2$

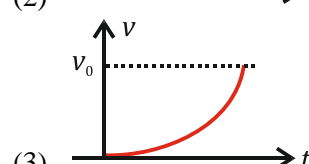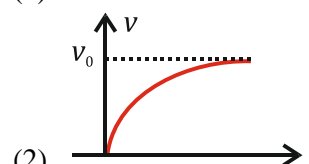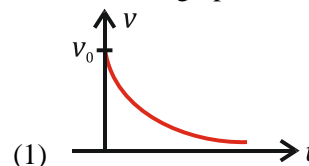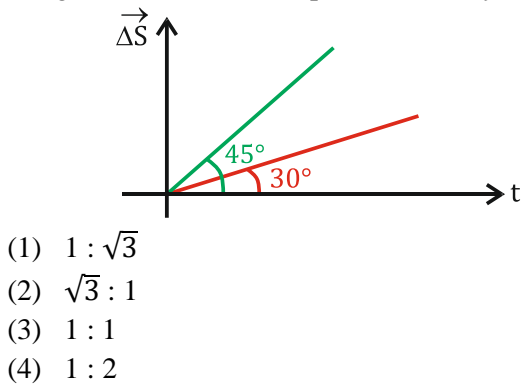**8.** Which of the following is correct rms speed vs temperature graph. If they are related as $V_{rms} = \sqrt{\dfrac{3RT}{M}}$

(1)

(2)

(3)

(4)
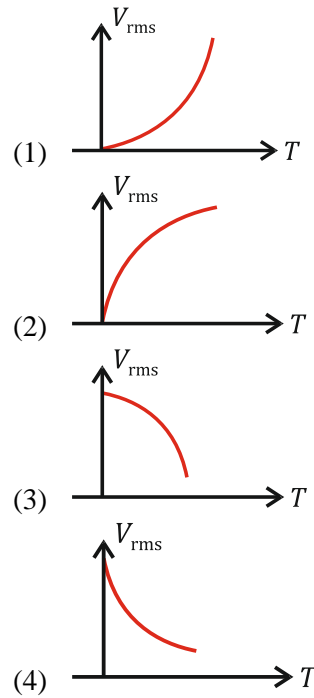
9. Which of the following figures represent the variation of particle momentum and the associated de-Broglie wavelength? **(2015)**

(1)

(2)

(3)

(4)
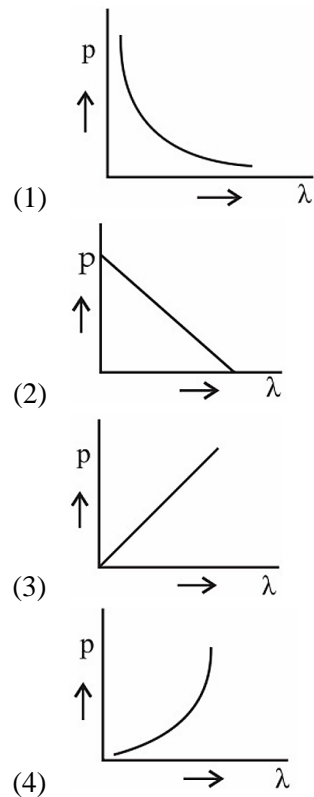
10. According the Einstein's photoelectric equation, the graph between the kinetic energy of photoelectrons ejected and the frequency of incident radiation is, if they are related as K.E = E − ϕ **(2004)**

(1)

(2)

(3)

(4)

11. The graph which shows the variation of $\dfrac{1}{\lambda^2}$ and its kinetic energy, E is (where λ is de Broglie wavelength of a free particle) and they are related as

$$E = \dfrac{h^2}{2m\lambda^2}$$

(1)

(2)

(3)

(4)
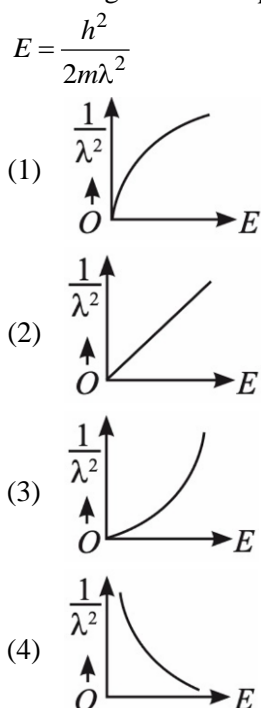
12. The variation of susceptibility χ with absolute temperature T for a paramagnetic material is related by $\chi \propto \dfrac{1}{T}$, then which of the following is correct graph.

(1)

(2)

(3)

(4)

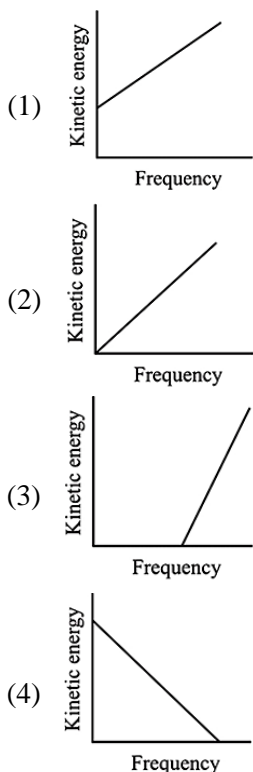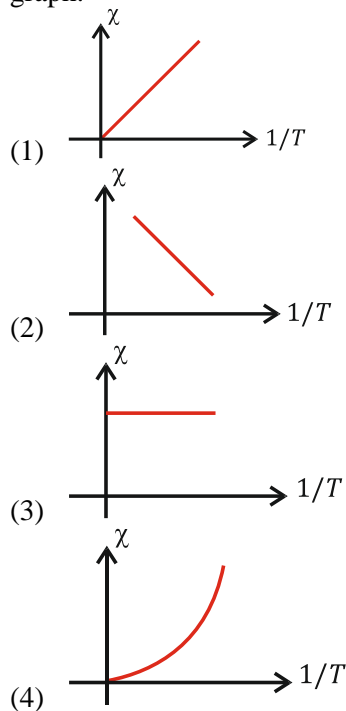**13.** In SHM a particle started from mean position and its acceleration and velocity can be given as $A\omega^2 \sin \omega t$ and $A\omega \cos \omega t$ then correct graph between v and a will be:

$$\dfrac{a^2}{(A\omega^2)^2} = \dfrac{v^2}{(A\omega)^2} = 1$$

(1)

(2)

(3)

(4)
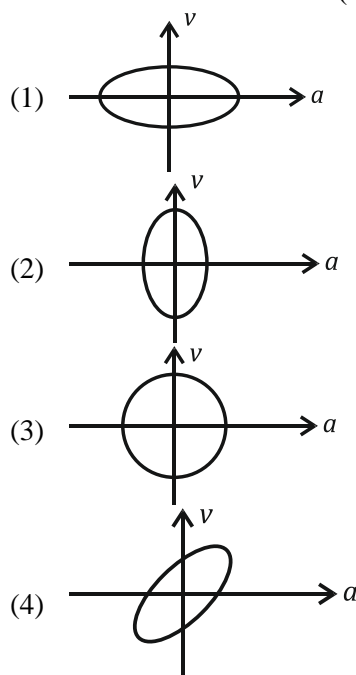
14. $x = a\sin t$, $y = a\cos t$ find $\dfrac{dy}{dx}$

(1) $\tan t$ (2) $\cot t$

(3) $-\dfrac{t}{\cot t}$ (4) $-\dfrac{t}{\tan t}$

15. You are given the equation of a curve:

$$\dfrac{x^2}{16} + \dfrac{y^2}{4} = 1$$

Which of the following correctly represents the graph between x and y?

(1) An ellipse centered at origin with major axis along x-axis and x-intercepts at ± 4
(2) An ellipse centered at origin with major axis along y-axis and y-intercepts at ± 4
(3) A parabola opening along x-axis
(4) A circle of radius 4 centered at origin

16. Two ellipses are given:

Ellipse A: $\dfrac{x^2}{16} + \dfrac{y^2}{4} = 1$

Ellipse B: $\dfrac{x^2}{4} + \dfrac{y^2}{1} = 1$

Which ellipse has a greater area?

(1) Ellipse A
(2) Ellipse B
(3) Both have same area
(4) Can't be determined from given data

17. Which equation will produce an ellipse that appears taller than it is wide?

(1) $\dfrac{x^2}{9} + \dfrac{y^2}{25} = 1$

(2) $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$

(3) $\dfrac{x^2}{16} + \dfrac{y^2}{16} = 1$

(4) $\dfrac{x^2}{36} + \dfrac{y^2}{36} = 1$

18. The equation $(x - 3)^2 + (y + 4)^2 = 25$ represents a circle with:

(1) Center: (3, 4), Radius: 5
(2) Center: (–3, –4), Radius: 25
(3) Center: (3, –4), Radius: 5
(4) Center: (–3, 4), Radius: 5

19. If the area of a circle represented by $x^2 + y^2 - r^2$ is 49π, what is the correct equation of the circle?

(1) $x^2 + y^2 = 49$ (2) $x^2 + y^2 = 7$
(3) $x^2 + y^2 = 14$ (4) $x^2 + y^2 = 154$

20. For the parabola $x^2 = 8y$, find the slope of the tangent at point (x, y).

(1) $\dfrac{4}{x}$ (2) $\dfrac{x}{4}$

(3) $\dfrac{8}{x}$ (4) $\dfrac{x}{8}$

21. In the parabola $x^2 = 4ay$, what happens to the slope of the tangent as the point moves higher (i.e., y increases)?

(1) Slope increases
(2) Slope decreases
(3) Slope remains constant
(4) Slope tends to zero

22. Find the slope of the tangent to $y = \dfrac{1}{x^2 + 1}$ at $x = 1$.

(1) -1 (2) $\dfrac{-2}{(x^2 + 1)^2}$

(3) $-\dfrac{1}{2}$ (4) $-\dfrac{1}{4}$

23. For $f(x) = x^3 - 3x$, the function has:

(1) One max and one min point
(2) No extreme values
(3) Two maxima
(4) One minimum only